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can exceed the delicacy and finish of the figures.—*Newman's Entomologist*.

GEOLOGY.

THE DRIFT PERIOD.—In a paper read at the Lyceum of Natural History, New York Oct. 24, 1870, Prof. Newberry observed:—In the sequence of events included in our Drift period there is a marked break, a middle period, during which, over most of the north-western states, no Drift deposits were made, and when most of this area was covered with a forest growth and sustained many and large animals. At a subsequent period, all parts of this area, less than five hundred feet above the highest of our present great lakes was submerged, and most portions of it covered to greater or less depth, with new Drift deposits, clays, sands, gravel and boulders, a large part of northern and remote origin. Nearly all the large boulders of the Drift belonging to this later epoch are sometimes of great size (one hundred tons) and have been *float*ed to their present positions, as they overlie undisturbed stratified sands and clays, which would have been broken up and carried away by glaciers or currents of water moving with sufficient velocity to transport these blocks. Hence they must have been floated from the Canadian highlands, the place of origin of most of them, by *icebergs*. This epoch of the Drift period I have therefore termed the Iceberg Epoch. During this epoch the submergence of the land in the interior of the continent, was greater than in the epoch of the deposition of the Champlain and Erie clays, and all the area north of the Ohio was covered with water up to a height of over five hundred feet above Lake Erie, or one thousand one hundred feet above the ocean level. The highlands of south eastern Ohio, and most of the country south of the Ohio river were not covered by this flood and now bear no drift deposit of any kind. Tracing out the line of ancient water-surface, we find that the depression was greater towards the north, so that the Alleghanies and their foot-hills, and also a wide area of comparatively low country in the southern states formed not only a shore, but a continental limit to the great interior iceberg-ridden sea of the later Drift Epoch. In the western reaches of this sea, which was of fresh water in the later centuries of its existence, was deposited the Löss or “Bluff” which I have elsewhere desig-

nated as the later lacustrine, non-glacial drift. During the deposition of the Loess the interior sea was already narrowing and growing shallower by the cutting down of its outlet or by continental elevation, or both. The descent of the water-level and decrease of water-surface have been going on perhaps constantly, but not uniformly, to the present time, when the area of the great lakes is the insignificant eighty-five thousand square miles it now is. In the descent of the water-level, retarded at certain periods, terraces and beach lines were formed at various places by the shore waves. With these history begins. This then is the classification I would suggest of the drift deposits as they occur in the valley of the Mississippi, premising that here, as in other geological periods, the column is nowhere absolutely complete :—

PERIOD.	EPOCHS.	STRATA.	NOTES.
Quaternary.	Terrace.	Terraces, Beaches, Löss.	{ Sand and gravel beaches with logs, leaves, and fresh-water shells. Löss with fresh-water land-shells.
		Iceberg Drift, Löss.	{ Boulders, gravel, sand, and clay, drifted logs, elephant and mastodon teeth and bones.
		Forest Bed.	{ Soil-peat with mosses, leaves, logs, stumps, branches, and standing trees, mostly red cedar. Elephas, mastodon, Castoroides, etc.
	Glacial.	Erie Clays.	{ Laminated clays with sheets of gravel, occasional rounded and scratched northern boulders, many angular pieces of underlying rocks.
		Glacial Drift.	{ Local beds of boulders and rarely boulder clay resting on the glaciated surface.

From the above table it will be seen that the remains of elephant, mastodon, and the gigantic beaver, occur in the forest-bed and in all the succeeding drift deposits. It should also be said that they are found in still greater abundance in peat-bogs and alluvial deposits which belong to the present epoch. We have seen that the submergence of the later drift epoch, though so widespread, left a large part of the area lying between the Mississippi and Atlantic uncovered. This area the elephant, mastodon, great beaver, etc., inhabited during the continuance of the flood that covered the forest bed. From this retreat they issued with the subsidence of the water, following the retreating shore-line, till they occupied all the region now exposed about the great lakes.

By what influence they finally became extinct, we cannot yet say. It has been claimed that they continued to exist down to the advent of man, and that he was an agent in their destruction. This statement may be true but requires further proof before it can be accepted with confidence. The vegetation of the forest bed indicates a cold climate, thus confirming what we had otherwise learned of the habits of the extinct elephant. He was clothed with long hair and wool, was capable of enduring, and probably preferred a subarctic climate, and was associated in this country as in Europe, with the musk ox and the reindeer. We may therefore infer that progressive increase in the annual temperature, drove most of the animals of the Forest-bed northward, and caused to gather on the shores of the Arctic sea, the herds of elephants whose remains so much impress all travellers who visit that region. This was probably the scene of the last vigorous and abundant life, and of the death of the species; an event consequent, perhaps, on the action of local causes, which we shall comprehend when we have opportunities of studying the record. One remarkable statement in regard to the Forest-bed requires notice. In more than one instance, parties digging wells in south-western Ohio, have reported not only that they found a black soil and logs, but "some of the logs bore marks of the axe, and were surrounded with chips." These stories I formerly rejected as pure fabrications; but in the light of recent observations, they seem to me to be in part true, and not difficult of explanation.—*Nature*.

THE STRUCTURE OF FOSSIL CRYPTOGRAMS.—At the recent meeting of the British Association for the Advancement of Science held at Edinburgh, Prof. W. C. Williamson read a paper in which he suggested a new mode of classification of fossil cryptogams. He proposes to separate the vascular cryptogams into two groups, the one comprehending Equisetaceæ, Lycopodiaceæ and Isoetaceæ, to be termed the Cryptogamiæ Exogenæ, linking the Cryptogams with the true Exogens through the Cycads; the other, called the Cryptogamiæ Endogenæ, to comprehend the ferns, which will unite the Cryptogams with the Endogens through the palms. He considers the fossil arborescent Cryptogams allied to Lycopods including the *Lepidodendra*, *Stigmaria*, *Sigillaria*, etc., to be true cryptogams with an exogenous woody axis, and not entitled to the epithet of Acrogens. They differ from ferns in not having closed

fibro-vascular bundles ; but their growth results from the development, within the stem, of a vascular woody cylinder, which grew thicker year by year, such thickenings being the result of additions to the exterior of the previous growth. Professor Williamson's theory was, however, sharply contested by Mr. Carruthers and Professors McNab and Dyer, who adhered to the old view of the essential identity of structure of all woody cryptogamous stems.—A. W. B.

SUPPOSED VEGETABLE FOSSILS.—At a recent meeting of the Geological Society of London, Mr. W. Carruthers enumerated a number of bodies which he believes to have been erroneously described as vegetable fossils. Among these are dendritic markings which have been treated as foliage ; two genera and three species of supposed fossil fruits which are really impressions of air-bubbles in moist clay ; reptilian eggs in the Stonefield Slate and Wealden of the Isle of Wight which have been considered to be fruits ; and the curious prehensile hooklets, arranged in rows on the arms of a calamary, found fossil in the lithographic stone of Solenhofen, which have been figured and described by Count Sternberg as a fossil vegetable.—A. W. B.

THE GEOLOGY OF THE WHITE MOUNTAINS.—The geology of these mountains is most intricate. It is not known whether its granite and slate rocks are of Laurentian, Silurian, or Devonian age alone, or whether all of these formations may not be represented. Prof. C. H. Hitchcock, the state geologist of New Hampshire, has made the interesting discovery of upper Silurian corals in Littleton, N. H. The limestone containing these corals has been traced for about three miles, and appears to be overlaid by a clay slate, containing a few worm trails. The limestone rock appears identical, as we learn from the "American Journal of Science," with that cropping out upon Lake Memphremagog.

ORIGIN OF OCEAN CURRENTS.—It seems that the views of ocean currents advocated by Prof. Carpenter were first recognized by Prof. J. D. Dana, in 1852, in the reports of "Wilkes's Exploring Expedition" and the "American Journal of Science." Prof. Dana remarks that facts elicited by Carpenter from deep sea explorations "remove all remaining doubt with regard to the universality of the movement and the oneness of the system. At the same

time there does not appear to be any good reason for separating from the system the Gulf Stream, as is done by Dr. Carpenter." Prof. Dana also seems to agree with Croll as to the thermal work of the Gulf Stream.

NEW CARBONIFEROUS SPIDER.—Mr. Woodward describes, as stated in "Nature," from the Dudley coal field, a Phrynus-like spider which he named *Eophrynus Prestvicii*. A fossil Lycosa-like spider had previously been found, also a Phalangium-like species from the same formation. The present animal represents a third group of Arachnids which lived during the Coal period.

SINGULAR ALBINO.—The Museum of the Agricultural Department at Washington, contains an "albino" Bob-o'-link (*Dolichonyx oryzivorus*), shot in that vicinity, illustrating a rare and curious condition. It is of a uniform clear pale yellow, exactly like a canary-bird.—ELLIOTT COUES.



MICROSCOPY.

PROCEEDINGS OF THE SECTION OF MICROSCOPY OF THE BOSTON SOCIETY OF NATURAL HISTORY, OCT. 11, 1871.—Mr. Greenleaf stated in reference to the living Amœbæ shown at the last meeting, that he had not found the slightest trace of any return movement in those organisms. He had seen a central forward current, but never the two return side currents, so often described. He considered these merely optical.

Mr. Stodder said he had tried collecting germs from the atmosphere. He had always found great difficulty in obtaining microscopically pure distilled water. This last summer he had used a glass vessel filled with ice, on which the moisture of the air condensed outside. In this manner nothing not in the air was obtained. In his examinations he had followed the method given by Dr. Maddox in the Feb. (1871) number of the "Monthly Microscopical Journal."

He first placed his germs in molasses, but subsequent examinations showed that this contained germs of its own. He next took pure crystals of sugar dissolved in the water collected, and placed on a slide. To keep the moisture present he had used the method given by Dr. Maddox.